

**Defended by Reason:  
Can Theory Provide Another Approach to  
Transformation?**

**A Monograph  
by  
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## **Abstract**

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The Army as well as the other armed services began a transformation in the late 1990s in order to meet the challenges of warfare in the future. This effort is characterized by utilizing technology as the catalyst for change. The process has proceeded with fits and starts since that time and virtually nobody is certain of the outcome. A review of history demonstrates that there is a viable alternative to a technological methodology for transformation that could stimulate change across the services. The stimulant mentioned is in the form of a new theory of war. A new American theory of war could provide a different approach for navigating through the uncertainty of transformation. Theory as a logical starting point can establish the intellectual foundation for doctrine and organizations, developing new technology to support the doctrine, and the training paradigm to mature the concepts. Further, theory can drive development over a very long period of time as demonstrated by the evolution of airpower during the 20<sup>th</sup> century. By contrast, technology as a catalyst does not always provide a clear path to service reform. In the 1980s the Army formed a high technology test bed division in an attempt to utilize technology to stimulate long-term change in the force. The test bed experiment is remarkably similar to the current effort to transform. The effort largely failed due to a lack of intellectual underpinning grounded in a theory of war. This monograph examines case studies in airpower theory and the high technology test bed to demonstrate that theory is a prerequisite for long-term change expressed as transformation. Based on an analysis of the case studies this monograph recommends that in order to move transformation in the right direction over the long-term the United States military must adopt a new theory of war. This approach provides a logical basis for development of doctrine, organizations, and technology while ensuring that transformation has the proper intellectual foundation to weather the challenge of war in the 21<sup>st</sup> century rather than wither as the high technology test bed did in the 1980s.

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# **CHAPTER ONE**

## **HOW ARE WE REFORMING?**

As the armed forces entered the 21<sup>st</sup> century the United States Army as well as the larger defense community embarked on an effort to reform the military. Many have questioned the need for reform and the direction it has taken so far. This monograph examines official rationale for reform. It will also look at the direction set for proposed reform. This paper examines whether the current approach is adequate to stimulate the process or if there is a viable alternative that can better act as a catalyst for change. A vast body of evidence suggests that an alternative method would better direct reform. This monograph investigates this possibility and offer suggestions as to how the military can bring about lasting change.

Before examining the issue of reforming the military, the term reform requires definition. According to the *Webster's New World College Dictionary* reform is defined as a process “to make better by removing faults or defects” or “a correction of faults or evils.”<sup>1</sup> Reform is an effort to fix something or make it better based on a perception that a defect exists or that the system does not operate at top efficiency. In an ever-changing world little time passes before concepts and systems become obsolete. The velocity of change forces organizations to constantly adapt to maintain maximum efficiency. The environment of warfare is constantly evolving and military organizations must make corresponding innovations to maintain readiness.

In 1991 the Soviet Union collapsed under the weight of an inefficient and archaic economic and social system. With this collapse the Cold War ended and the world entered a new era of unknown dangers. During the Cold War a bi-polar world existed where the nation’s military forces organized, trained, and equipped to fight a specific way against a single equivalent threat. With the demise of the Soviet Union the US military entered uncharted waters as a dizzying

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<sup>1</sup> Victoria Neufeldt, ed., *Webster's New World College Dictionary*, Third Edition (New York: Simon and Schuster, 1997) 1128.

spectrum of threats and conflict confronted the armed forces. The Cold War masked this spectrum of conflict from our military though it always existed. After a few years attempting to maintain readiness service leaders concluded that the pace of change had outstripped the military's ability to adapt. In light of the developments the services resolved to reform the organizations.

The Army formally launched an effort to reform in 1999 when the Chief of Staff of the Army, General Eric Shinseki issued *The Army Vision*. This document outlined a plan for reform known as the transformation campaign plan. Transformation is supposed to provide a path for the Army to change the way it conducts operations as the environment of war evolves. *The Army Vision* recognized that the breadth of warfare had changed and the document identified this phenomenon as the “full spectrum” of war. Previously, the Army had focused its doctrine and organization against defeating a single threat in a specific form of war – conventional. The Army now embarked on an effort to transform to develop a variety of capabilities, maintain readiness to fight a plethora of threats, and win across the “full spectrum” of war.<sup>2</sup>

Joint service documents such as *Joint Vision 2020* published in 2000 echo the *Army Vision* stating that the joint services must be ready to fight anywhere in the full spectrum. Further, the *Joint Vision* adopts the same language of reform as the Army, pushing the services to transform the way they carry out their respective missions.<sup>3</sup> Transformation’s essence is to push the services to make a cultural shift about how they think about and conduct warfighting. The approach of the service organizations to move transformation forward is by taking advantage of advanced technology. For example, *The Army Vision* states that “[W]e will jumpstart the process [transformation] by investing in today’s off-the-shelf technology to stimulate the development of doctrine, organizational design, and leader training even as we begin a search for new

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<sup>2</sup> Department of the Army, *The Army Vision: Soldiers on Point for the Nation, Persuasive in Peace, Invincible in War* (Washington DC: United States Government Printing Office, 1999) 1-2. Hereafter cited as *The Army Vision*.

technologies for the objective force.”<sup>4</sup> Another official Army document echoes these sentiments stating that “emerging technologies promise a clear path to the future.”<sup>5</sup> This statement resonates in *Joint Vision 2020* also when it asserts that taking advantage of technology is the key to “the development of doctrine, organizations, training and education, leaders and people . . .”<sup>6</sup> In essence, the services intend to use technology as a catalyst to the intellectual change desired to meet the challenges of the 21<sup>st</sup> century. This is an approach that some militaries, including the United States, have used to stimulate reform as in the Pentomic era.<sup>7</sup> However, there is another way that our services may utilize to achieve the desired transformation. I believe that a new theory of war is a catalyst that the services should utilize to build intellectual capital to drive wholesale changes in doctrine, technology, and organization. This is the logical starting point for bringing about the change that will enable the U. S. military to maintain its preeminence throughout the 21<sup>st</sup> century.

Russell F. Weigley pointed out in his seminal work *The American Way of War* that U. S. forces have used a military strategy of annihilation for nearly all of its 225-year history.<sup>8</sup> Yet, it appears that this paradigm for fighting wars is changing. The evolution of warfare is forcing our military to shift from weight as a method of winning wars to finesse<sup>9</sup> as evidenced by emphasis on information operations and precision attack.<sup>10</sup> Military establishments by their very nature are not progressive organizations and a common approach to revamp forces has been the infusion of

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<sup>3</sup> Department of Defense, *Joint Vision 2020* (Washington DC, U. S. Government Printing Office, 2000), 3-4. Hereafter cited as *Joint Vision 2020*.

<sup>4</sup> *Ibid.*, 3.

<sup>5</sup> Department of the Army, *Concepts of the Objective Force: United States Army White Paper* (Washington DC: United States Government Printing Office, 2001), 1.

<sup>6</sup> *Joint Vision 2020*, 3.

<sup>7</sup> Richard L. Kugler and Hans Binnendijk, “Choosing a Strategy,” in *Transforming America’s Military*, Hans Binnendijk, ed. (Washington DC: National Defense University Press, 2002), 66.

<sup>8</sup> Russell F. Weigley, *The American Way of War: A History of U. S. Military Strategy and Policy* (Bloomington, Indiana: Indiana University Press, 1973), xxii.

<sup>9</sup> Roger Spiller, *Sharp Corners: Urban Operations at Century’s End*, (Fort Leavenworth, Kansas: U. S. Army Command and General Staff College Press, 2001) 125-126.

<sup>10</sup> *Joint Vision 2020*, 2.

new technology. However, there is a vast body of historical evidence that challenges this manner of affecting change.

Two years after the publication of *The Army Vision*, the United States Army has attempted to revitalize the intellectual soul of the organization through the introduction of FM 3-0, *Operations* in June 2001 as the statement of official doctrine. This document, while introducing the concept of “full spectrum” warfighting, is primarily focused on a bygone era of warfare between nation-state actors. However, as one author points out, “we are no longer in a world where the old rules of state warfare apply.”<sup>11</sup> Another agrees stating that “the state’s attempt to monopolize violence in its own hands is faltering. Brought face to face with the threat of terrorism . . . then the kind of war that is based on the division between government, army, and people seems to be on its way out.” Finally, “the place of the state will be taken by warmaking organizations of a different type.”<sup>12</sup> Yet, the theoretical underpinnings of FM 3-0 are readily identifiable as the concepts of classical theory found in Clausewitz, Antoine de Jomini, and J.F.C. Fuller mixed with sprinklings of the *Vision* statements. For example, the center of gravity and decisive points are Clausewitzian ideas while lines of operation and principles of war are drawn from Jomini and Fuller.<sup>13</sup> The term “full spectrum operations” is a lift from the *Vision* statements and is an attempt to develop a better understanding of the evolving nature of war.<sup>14</sup> An attempt to unify the book is done through a discussion of the technological dimension in each chapter. FM 3-0 correctly identifies technology as a battlefield enabler, yet the manual does little to open the minds of professional soldiers to further their understanding of future warfare. A new doctrine will not realize a

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<sup>11</sup> Robert D. Kaplan, *The Coming Anarchy* (New York: Vintage Books, 2000), 47.

<sup>12</sup> Martin Van Creveld, *Transformation of War* (New York: The Free Press, 1991), 192.

<sup>13</sup> FM 3-0, *Operations* (Washington DC: United States Government Printing Office, 2001), 5-7-5-8 and 4-11-4-15.

<sup>14</sup> *Ibid.*, 1-14-1-16.

wholesale transformation of the intellectual soul of the force without a thread founded in a sound unified theory that accounts for all facets of the “full spectrum” of war.<sup>15</sup>

The 1961 *Dictionary of United States Army Terms* defined doctrine as “principles, policies, and concepts, applicable to a subject, which are derived from experience or *theory*, compiled and taught for guidance. It represents the best available thought that can be defended by reason.”<sup>16</sup>

The Army has tried to utilize the best available theory in writing FM 3-0, but the synthesis is inadequate based on the rate of change in warfare. Therefore, our understanding of wars is limited and our ability to adapt to its many forms is correspondingly small due to that lack of unifying intellectual foundation. In order to realize the intellectual change that our leadership desires, the services must have a new American theory of war to provide direction for the future.

What is the function of theory and how can it help foster a true transformation?

Military theory is “a conceptual map” that informs about “how war plays.” It defines the nature of war and provides a framework for understanding new discoveries as it evolves. This provides the intellectual foundation that leads to creativity and the ability to formulate methods to “unite technology” with warfighting.<sup>17</sup> In addition to enhancing understanding, theory should provide the military professional with a vision for the future. In other words, theory gives a concept of how to conduct military operations in future combat. The vision provides direction for the development of a force for an extended period into the future. In short, theory should provide, after much thought and synthesis, the “ability to **solve real-world problems**.<sup>18</sup>”

A well-formulated theory can assist the writing of doctrine after an open and honest debate among professionals. With theoretical underpinnings, educated professionals can devise a logical

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<sup>15</sup> Gordon M. Wells, “The Center of Gravity Fad: Consequence of the Absence of an Overarching American Theory of War,” Association of the United States Army *Landpower Essay* (Arlington, Virginia: The Institute of Land Warfare, 2001), 11.

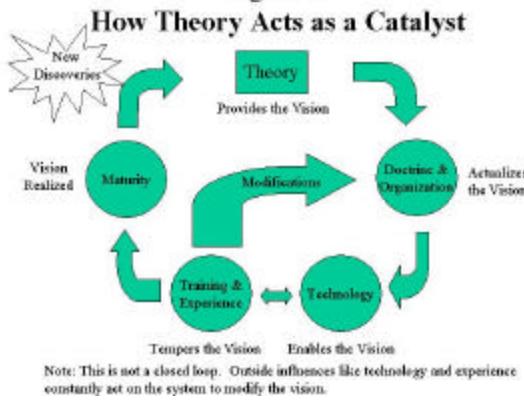
<sup>16</sup> Department of the Army, Army Regulation 320-5, *Dictionary of United States Army Terms* (Washington DC: United States Government Printing Office, 1961) 201. (Emphasis added).

<sup>17</sup> James J. Schneider, “How War Works: The Origins, Nature, and Purpose of Military Theory,” Unpublished paper (Fort Leavenworth, Kansas: School of Advanced Military Studies, 2001), 2-3.

<sup>18</sup> *Ibid.*, 10. Emphasis in original.

operating framework for common action. Theory also acts as a catalyst for synthesis of doctrine<sup>19</sup> and new technology and can also drive the development of technology as in the case of airpower theory. Armed with doctrine and technological tools, military professionals can devise organizations to make a reality of theoretical concepts. Training can test concepts that result in debunking false hypotheses and refining ideas that contain partial truths.

**Figure 1.**



War is the ultimate test of a theory and the vision contained therein. Historically, no theory has provided a perfectly clear picture of war and the future. Theory has provided direction that required modification based on experience derived from training and war. Experience tempers theory into mature concepts embodied in doctrine, technology, and organization for use by a well-educated officer corps. (Refer to Figure 1.)

In sum, military theory could act as the catalyst for our military organizations enabling them to achieve a true intellectual transformation. Theory spawns a revolution of the military mind through collective debate and critical thinking, which leads to the promulgation of doctrine. Attempts to bring about intellectual change through the infusion of technology may not produce a transformation. A doctrine embedded in theories of a past era combined with periodic vision statements will only produce intellectual schizophrenia and uncertainty and as one writer observed, “[D]octrine developed without solid comprehensive theory at its base is, quite simply, doctrine with clay feet.”<sup>20</sup> A new American theory of war could provide the direction to transform our intellectual foundations. It will produce debate, yet it will also provide direction for future for generations of soldiers to follow. The development of airpower theory provides an

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<sup>19</sup> Wells, “The Center of Gravity Fad,” 11.

<sup>20</sup> *Ibid.*, 11.

excellent example of how theory can infuse intellectual energy into a force for long-term organizational transformation and intellectual growth.

## CHAPTER 2

### AIR THEORY REFORMS THE MILITARY AND DRIVES AIR POWER DEVELOPMENT IN THE 20<sup>TH</sup> CENTURY

The ideas and concepts of aviation theorists drove the development of technology, doctrine, and organization for decades in the 20<sup>th</sup> century and presents a striking view as to how theory can act as the fulcrum of reform. Long before aircraft could fly with large payloads over immense distances at high altitudes, a small group of men imagined how airpower could transform warfare. Giulio Douhet, William “Billy” Mitchell, Hugh Trenchard and others envisioned airplanes that could carry tons of bombs thousands of miles while flying at extremely high altitudes delivering ordnance on target. This they believed would completely change how to conduct wars and more importantly, win wars. This chapter addresses how this vision became reality. This process – which some argue is still in development – could serve as a model for the services to energize transformation by providing direction over an extended period of time.

Contrary to common belief technology *did not* foster the development of air concepts and ideas rather, theory stimulated improvements in technology.<sup>21</sup> Giulio Douhet of the Italian army was the first to crystallize a theory of aerial warfare in 1909 only six years after the first heavier than air flight. In that year he published a paper proposing general principles for the conduct of war in the air. From that time until his death in 1930, Douhet wrote prolifically about this aspect

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<sup>21</sup> Donaldson D. Frizzell, “Early Theories of Air Strategy,” Unpublished Monograph (Carlisle Barracks, Pennsylvania: United States Army War College, 1972) 5.

of warfare, culminating in his brilliant treatise *Command of the Air*.<sup>22</sup> This text demonstrates the maturity of his vision and has become a standard text around the world for the study of airpower theory.

In *Command of the Air*, Douhet asserts that the airplane can be the decisive instrument of warfare. Douhet, like many of his contemporaries, was appalled at the carnage and stalemate of the First World War. Although he had written short papers addressing the potential for mechanization and offering concepts of air war well before 1914, his efforts took on new urgency against the backdrop of destruction of the Great War. As a result of his experience Douhet believed that the only way to break the deadlock of modern war was by introducing a new concept of war centered on the airplane.<sup>23</sup> Militaries should use the airplane, he said, against decisive points including industry, transportation nodes, and population centers deep in the enemy homeland to achieve physical and psychological destruction. Central to this concept is that targeting should have focus and a military should not attempt to attack every target.<sup>24</sup>

To enable the airplane to hit deep targets required an air arm independent of the army. Ground commanders tended to demand that airmen use their aircraft for reconnaissance and artillery spotting in the First World War. To Douhet such tactics prevented the airplane from achieving its full potential as an offensive weapon decisive on the battlefield. Therefore, Douhet advocated reforming the Italian army by organizing military aircraft into an independent air force to realize the promise of air war as a decisive component of warfare.<sup>25</sup> Unfettered by conservative ground commanders the airplane would revolutionize the conduct of campaigns and eventually the outcome of war.

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<sup>22</sup> *Ibid.*, 8.

<sup>23</sup> Colonel Phillip S. Meilinger, “Giulio Douhet and the Origins of Airpower Theory,” in *Paths of Heaven: The Evolution of Airpower Theory* (Maxwell Air Force Base, Alabama: Air University Press, 1997), 8-9.

<sup>24</sup> *Ibid.*, 11 and Giulio Douhet, *Command of the Air* in *Roots of Strategy Book 4* (Harrisburg, Pennsylvania: Stackpole Publishing, 1999), 294-297.

<sup>25</sup> *Ibid.*, 304-306.

To carry out effective deep attacks in the enemy homeland required an aircraft capable of carrying large bomb loads, able to fly at high speed, and at high altitudes to avoid anti-aircraft fire from the ground. Douhet dubbed such an aircraft the “battle plane,” which would resemble a “flying fortress” bristling with self-protecting guns.<sup>26</sup> At the time that Douhet offered his vision in 1921 the fledgling airplane was not capable of the aerial feats he described. While the technology improved by leaps and bounds during the war, planes still flew at relatively slow speeds, low altitude and did not have the range for long flights or heavy loads. This fact made it easy for conservative army commanders to dismiss Douhet’s vision as pure fantasy.<sup>27</sup> Contrary to their narrow view, Douhet’s concept of the battle plane would gain momentum and airmen used it to force the advancement of military aeronautical technology.

Not all of Douhet’s writings proved correct. In fact, much of *Command of the Air* consists of erroneous assertions based on dubious assumptions. For example, the battle plane in World War II was unable to reach its targets impervious to enemy ground fire or pursuit aircraft. Further, his belief that attacking population centers could break the will of the enemy was far-fetched.<sup>28</sup> Yet, Douhet is still important as the first theorist of air warfare because his vision planted a seed in the minds of the other airmen. These men would take his concepts and expand upon them to bring it to reality in the form of doctrine, organization, and technological advancement. Among the men enamored by Douhet’s vision were Major Edgar Gorrell and Colonel William Mitchell of the United States Air Service in World War I.

Gorrell was a Signal Corps engineer sent to Europe upon the United States entry into World War I to study and determine the needs of the American Expeditionary Force (AEF) fledgling Air Service for war on the continent. Gorrell arrived in Italy in 1917 and quickly established liaison with Gianni Caproni, an Italian aviation industrial magnate. Caproni’s company was under

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<sup>26</sup> *Ibid.*, 360-367.

<sup>27</sup> Robert F. Futrell, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force, 1907-1960*, Vol. 1 (Maxwell Air Force Base: Air University Press, 1989), 16.

contract from the Italian army to produce a new advanced bomber. Gorrell was impressed by Caproni's designs and the underlying theoretical concepts and inquisitively pressed Caproni for as much information as he could get. Caproni's design concepts were derived from Douhet's germinating idea of strategic bombing and the new bomber was meant to fulfill that vision. Caproni provided the young major with a copy of his friend Douhet's pamphlet titled "Let Us Kill the War, Let Us Aim at the Heart of the Enemy!". The paper elucidated many of Douhet's early ideas of strategic bombing using the "battle plane" and Gorrell became enthralled with the ideas contained therein. After observing Italian methods and reading Douhet's paper, Gorrell penned a memorandum for the U.S. Army detailing his findings and discussing a theory of strategic bombing along Douhetian lines.<sup>29</sup> Here is the genesis of American thinking on the application of airpower.

William "Billy" Mitchell went to France only days after America's declaration of war to observe and report on developments in the French and British air services. As Gorrell worked closely with the Italians, Mitchell simultaneously developed liaisons with the allies on the Western Front. Mitchell noted that the French organization and technical attainments were highly advanced. However, he believed that French fixation on defensive operations diminished the capability of their air arm.<sup>30</sup>

Mitchell found the ideas of the British far more palatable to his thinking and was heavily influenced by General Hugh Trenchard. The Royal Air Corps commander on the Western Front was a gruff personality who normally took offense at impudence, a characteristic exuded by the young Mitchell. Yet, contrary to expectations the two divergent personalities of Trenchard and Mitchell became fast friends and confidants. Mitchell absorbed many of Trenchard's ideas and co-opted them in his own emerging thoughts on airpower. Among the most important were

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<sup>28</sup> Douhet, *Command of the Air*, 292, 294, and 358-360 and Frizzell, "Early Theories of Air Strategy," 14 and 16-17.

<sup>29</sup> *Ibid.*, 33-34 and Meilinger, "Giulio Douhet and the Origins of Airpower Theory," in *Paths of Heaven*, 6-7.

Trenchard's belief that airpower could be best employed as an offensive arm. Further, for this arm to operate with maximum effectiveness it needed full leeway to plan operations independent of ground commanders.<sup>31</sup> These ideas were much in line with Douhet's and when Mitchell, through Gorrell, became acquainted with the Italian's concepts he cemented his own thoughts on airpower.

In July 1917 General John J. Pershing appointed Billy Mitchell the chief of the AEF Air Service in Europe. Among the many staff officers assigned to Mitchell's headquarters was Major Gorrell. Gorrell headed the technical section and had responsibility for production of campaign plans to support AEF operations. Gorrell and Mitchell easily meshed their ideas, which were a synthesis of Douhet and Trenchard. With Mitchell in command and a capable coterie of aggressive staff officers, the Air Service became a successful and essential component of AEF operations in 1918. Mitchell had planned to begin full-scale independent air operations against Germany in 1919 in line with the fast crystallizing concepts put forth by the Italian and Englishman. However, the November 1918 armistice scrapped Mitchell's plans.<sup>32</sup>

With the war at an end the stimulus for testing new concepts of warfighting faded and Mitchell turned to the pen to advance his ideas. Initially, Mitchell believed that the air service had a responsibility to support ground operations, but his thinking changed dramatically in the early 1920s. In 1922 Mitchell made a tour of European air forces and for the first time met Douhet in person. The men struck up an easy friendship and readily exchanged ideas. Douhet, fresh from publication of *Command of the Air*, doubtless hardened Mitchell's belief that for airpower to reach its full potential it had to operate unfettered by the plodding ground commanders. As a result, Mitchell now embarked on a mission to reform the United States military from the inside. The central components of his reform effort espoused an independent

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<sup>30</sup> Frizzell, "Early Theories of Air Strategy," 27-28.

<sup>31</sup> *Ibid.*, 29-30 and Lieutenant Colonel Mark A. Clodfelter, "Molding Airpower Convictions: Development and Legacy of William Mitchell's Strategic Thought," in *Paths of Heaven* (Maxwell Air Force Base, Alabama: Air University Press, 1997), 84.

air force for America whose primary employment concept was strategic bombing on the Douhetian model.<sup>33</sup>

The maturity of Mitchell's ideas is represented by his treatise on air warfare titled *Winged Defense*. An analysis of Mitchell's theory and Douhet's *Command of the Air* reveals striking similarities. For example, Mitchell espoused that "air power can hit at a distance . . . it will be able to fly anywhere over the hostile country" bypassing field armies. Further, "air forces will attack centers of production of all kinds, means of transportation, agricultural areas, ports and shipping. . ." Such attacks would, in Mitchell's opinion, demoralize enemy populations causing a quick capitulation to the nation that had air superiority.<sup>34</sup> The one area where Mitchell diverged from Douhet was in his belief that the new air force needed multiple types of aircraft to carry out strategic bombing campaigns. Mitchell believed that a "battle plane" was impractical because smaller fighter aircraft could effectively take on the heavy bombers. Instead, the air force should organize with a composite of aircraft specialized for bombing, pursuit, and reconnaissance.<sup>35</sup> Together these aircraft could satisfy all missions required of an air force.

Mitchell's ideas were lucid and worthy of interest and debate. Unfortunately, Mitchell could tolerate no debate. Those who did not accept his treatise as gospel were stupid in Mitchell's mind and he venomously attacked all naysayers. He became especially vociferous in his assaults upon conservative senior officers. These men did not believe that the lumbering, unreliable airplanes then crisscrossing the skies were capable of the feats envisioned by Mitchell. As a result, many Army leaders rejected Mitchell as a charlatan.

Mitchell's constant attacks eventually landed him in hot water as court-martial charges were preferred for insubordination in 1925. A board of officers found him guilty as charged in

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<sup>32</sup> *Ibid.*, 85-87.

<sup>33</sup> *Ibid.*, 92; Frizzell, "Early Theories of Air Strategy," 38-39; and Futrell, *Ideas, Concepts, Doctrine*, Vol. 1, 38-39.

<sup>34</sup> William Mitchell, *Winged Defense* in *Roots of Strategy* Book 4 (Harrisburg, Pennsylvania: Stackpole Books, 1999), 441.

<sup>35</sup> *Ibid.*, 413-414 and 508-510.

December of that year and, in February 1926, the army dismissed him from the service.<sup>36</sup> The dismissal of Mitchell did not end the debate over reform and the employment of airpower. Mitchell's theory of aerial warfare planted the seed of imagination in a generation of young army aviators. "Hap" Arnold, Haywood Hansell, Ira Eaker, and Carl Spaatz, to name a few, took up the crusade to transform the services and realize the vision of American airpower embodied by *Winged Defense*. The incubator of these concepts was the innovative Air Corps Tactical School (ACTS) where aviators experimented with the concepts and tested new technology that would have great repercussions in World War II and beyond.<sup>37</sup>

The ACTS was a truly progressive institution that remained open to new ideas and fittingly espoused the motto "*Proficimus More Irre tenti*" – "We Make Progress Unhindered by Custom."<sup>38</sup> Following World War I there was a perception in the army that the air service lacked a coherent doctrine of employment. The school began operating in 1920 with a charter to train army aviators in aerial tactics and command so they could assume positions of greater responsibility. A second mandate required the school to develop doctrine to guide future development and employment in war. The school faculty took on these missions with a vengeance, turning out hundreds of competent graduates who would lead America's air army through World War II. To write doctrine the instructors turned to the ideas of Billy Mitchell.<sup>39</sup>

The ACTS adopted many of Mitchell's concepts in a series of manuals issued as official doctrine throughout the late '20s and '30s. The most notable text was the doctrinal manual *Employment of the Combined Air Force* issued in 1926, which underwent several revisions thereafter. Among the ideas lifted from Mitchell in this manual were discussions of deep attack against vital centers such as industrial centers, transportation nodes, and command and control

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<sup>36</sup> Frizzell, "Early Theories of Air Strategy," 42-43 and Mark A. Clodfelter, "Molding Airpower Convictions," in *Paths of Heaven*, 102-105.

<sup>37</sup> *Ibid.*, 108.

<sup>38</sup> Charles Griffith, *The Quest: Haywood Hansell and American Strategic Bombing in World War II* (Maxwell Air Force Base, Alabama: Air University Press, 1999), 40.

centers. Further, the documents stated that airpower was not an adjunct to ground operations; instead it could achieve best results in independent operations preventing the enemy from engaging friendly army and naval forces. The statements of doctrine also incorporated portions of Douhet that Mitchell had not embraced. *Employment of the Combined Air Forces* suggested that the B-17 – a plane under development by the air corps – should be the centerpiece of the air fleet. The B-17 represented the embodiment of Douhet’s battle plane.<sup>40</sup> The plane had long range, a large payload, flew at high altitudes, and bristled with armament for self-protection. It was thought at the time that the B-17 would be impervious to pursuit aircraft and ground based anti-aircraft fire. The doctrinal documents published by the ACTS thus contained an interesting synthesis of the premier air theorists of the time. However, the ACTS also added some unique facets to the doctrine that one would not find in either *Command of the Air* or *Winged Defense*.

Neither Douhet nor Mitchell had any inhibitions about bombing civilian populations since both believed civil society was a legitimate target, so they placed little emphasis on precision targeting. The faculty at the ACTS, in particular Haywood Hansell and Hap Arnold believed that for moral, political, and economic reasons precision bombing would be an integral part of American doctrine. The doctrine called such bombing unescorted high altitude precision daylight bombing. Here is where the ACTS faculty developed their own concepts adding to the theories of Douhet and Mitchell and institutionalizing a wholly American doctrine of aerial warfare.<sup>41</sup> Theory had acted as the catalyst to develop a solid doctrine. Yet, technology still “existed mainly in theory and . . . had yet to be developed.”<sup>42</sup> Therefore, the airmen at the ACTS, with their ideas of high altitude precision daylight bombing, took up a quest to develop the right technology to support the concept that would last for decades.

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<sup>39</sup> Lieutenant Colonel Peter R. Faber, “Interwar United States Army Aviation and the Air Corps Tactical School: Incubators of American Air Power,” in *Paths of Heaven*, 185-187 and 213.

<sup>40</sup> *Ibid.*, 215-221 and Michael Sherry, *The Rise of American Airpower* (New Haven, Connecticut: Yale University Press, 1987), 52-53.

<sup>41</sup> Griffith, *The Quest*, 40-42.

<sup>42</sup> *Ibid.*, 40.

When the United States entered World War II the nation had a coherent doctrine grounded in theory and technological solutions under development to make the ideas a reality – or so it was thought at the time. In accordance with the doctrinal precepts adopted by the Army, the Air Corps had issued specifications for the development of a bomber that could accomplish the missions designated by doctrine. The aircraft that met Air Corps performance parameters was the venerable B-17. The plane could fly at a maximum speed of 300 miles per hour and cruise at 170 mph. It had four 1200 horsepower engines; carried a payload of 6000 pounds of bombs; bristled with thirteen .50 caliber machine guns for self-protection; and was equipped with the Norden bombsight to provide it with precision capability.<sup>43</sup> Altogether the Air Corps had done wonders in synthesizing theory into doctrine and enabling it with emerging technology that existed only in concept when the visionaries conceived the ideas. The experience of war would now temper the doctrine and drive a round of revisions and refinements to the concepts and enabling technology.

World War II revealed some serious flaws in the doctrine of unescorted high altitude precision daylight bombing and shortcomings in the technology supporting it. For example, high altitude precision daylight bombing “assumed that one could impose precise, positive controls over complex events.”<sup>44</sup> In other words, the instructors at ACTS believed that with detailed planning and adherence to tight flying formations for bombing runs, any unexpected threat to a mission could be overcome. This assumption proved false as flak and German fighters thoroughly disrupted Allied daylight bombing raids. Additionally, Douhet, Mitchell, and ACTS placed too much faith in offensive concepts at the expense of anticipating defensive countermeasures. The German *Luftwaffe* adeptly developed a well integrated air defense system that included radar for early warning; belts of ground based air defense guns; and swarms of fighters to challenge incoming bombers.<sup>45</sup> High Altitude precision daylight bombing also placed a premium in technology “as a panacea” for solving all problems. Inherent in this mistake is a

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<sup>43</sup> Futrell, *Ideas, Concepts, Doctrine*, 78-83.

<sup>44</sup> Faber, “Interwar US Army Aviation and The Air Corps Tactical School,” in *Paths of Heaven*, 220.

failure to remember that wars are fought by powers with opposing wills. This inability to understand the psychological aspect of warfare contributed to a failure to realize that the incessant bombing only hardened enemy will.<sup>46</sup> This is a direct contradiction of Douhetian and Mitchell core theory. Finally, while the targeting of industry did have its effect, the infrastructure of the Axis powers proved more resilient than expected.<sup>47</sup> This suggested that perhaps a different approach to strategic bombing was in order.

Unescorted high altitude precision daylight bombing doctrine envisioned by the ACTS had proven impracticable based on the previously mentioned reasons. In response, the newly independent Air Force<sup>48</sup> set about promulgating a doctrine that fit within the auspices of reality and the capabilities of current technology. Based on the experience of World War II the Air Force stepped back from a bomber-centric force with high altitude precision daylight bombing doctrine and instead espoused a balanced doctrine characterized by air dominance; global power through nuclear strategic bombing; a spectrum of capabilities; and a distributed force of transports, fighters, and bombers.<sup>49</sup>

Following World War II the Air Force believed that perhaps the option of nuclear strategic bombing would supplant the conventional as a result of the experience with Japan. Many hoped that nuclear bombing could produce the results that did not now appear possible with high altitude precision daylight bombing. Nuclear weapons did not require a great deal of precision, yet they produced effects far out of proportion to the resources expended to deliver the ordnance. Therefore, throughout the 1950s and 60s the Air Force raised a bomber fleet around a doctrine of nuclear strategic bombing. However, through the 1970s and 80s the affinity for a nuclear theory

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<sup>45</sup> *Ibid.*, 220-221.

<sup>46</sup> *Ibid.*

<sup>47</sup> United States Strategic Bombing Survey (USSBS), *The Effects of Strategic Bombing on Japanese Morale* (Washington, D. C.: United States Government Printing Office, 1947), 1-2 and 23-25; USSBS, *The Effects of Strategic Bombing on German Morale* (Washington, D. C.: United States Government Printing Office, 1947), 1-2; and Gian Gentile, *How Effective is Strategic Bombing? Lessons Learned From World War II to Kosovo* (New York: New York University Press, 2001), 62-63 and 121-122.

<sup>48</sup> Futrell, *Ideas, Concepts, Doctrine*, Vol. I, 196-197.

<sup>49</sup> *Ibid.*, 393 and 396-400.

and strategy began to wane as revulsion toward nuclear weapons arose and policymakers questioned the usefulness of strategy for defense based on mutually assured destruction.<sup>50</sup>

The adjustment to doctrine represented a departure from the early theories of airpower for several reasons. First, Douhet and Mitchell had both emphasized the preeminence of heavy bombers and discounted the effectiveness of fighter aircraft.<sup>51</sup> The war had shown this assertion as a patent miscalculation since enemy fighters had wreaked havoc on bomber formations. Therefore, the new doctrine recognized the need for a balance of fighter and bomber assets to ensure control of the skies. Second, technology had proved incapable *at that time* of producing the avionics, bomb sights, and bombs with the precision to strike point targets. The ACTS had maintained that in war bombers would hit their targets with precision to eliminate unnecessary collateral damage and the need to strike a target multiple times.

World War II demonstrated that adherence to the dogma of unescorted high altitude precision daylight bombing was a pipe dream. As a result, the new doctrine backed away from the precision aspect of strategic bombing. Although researchers would continue the quest for technology to realize the vision of precision strike, for the 1950s and 1960s the Air Force doctrine accepted a more realistic approach to bombing based on current capabilities. Finally, Douhet and Mitchell's emphasis on economic target sets in strategic bombing required rethinking. During the 1970s and 1980s John Boyd and John Warden embarked on a mission to modify the original vision, based on experience, into a more practical concept of targeting for strategic bombing.

Boyd and Warden realized that the strategic bombing efforts of World War II and later Korea and Vietnam had failed to produce the desired effect on the enemy. Theory and doctrine during this period had focused on vital centers that included economic targets such as heavy industry,

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<sup>50</sup> Bernard Brodie, *Strategy in the Missile Age* (Princeton, New Jersey: Princeton University Press, 1959), 152-157 and 165-172 and Robert Pape, *Bombing to Win: Air Power and Coercion in War* (Ithaca, New York: Cornell University Press, 1996), 35-38.

<sup>51</sup> Mitchell's *Winged Defense* supported the idea of a composite air force consisting of both bombers and fighters. Later when Mitchell published *Skyways* his ideas had changed to look almost identical to that of Douhet in supporting an air force with a preponderance of bomber aircraft.

transportation nodes, and oil refining. Both believed in the essence of Douhet and Mitchell's theories, but the approach to strategic bombing required modification to achieve full effect. In their separate quests to unlock the true key to strategic bombing Boyd and Warden struck on the concept of control warfare instead of economic warfare.<sup>52</sup>

Colonel John Boyd entered service in the late 40s and served as a fighter pilot in the Korean War flying the F-86 fighter jet. It was his experience in numerous combat missions in the famous "MiG Alley" that initiated his interest in understanding what enabled one opponent to defeat another. The key, he believed, lay in reacting more rapidly than one's opponent.<sup>53</sup> While Boyd did a great deal of thinking about this concept, it was not until after his retirement from the Air Force in the mid-70s that he began to set his thoughts to paper. Using history to analyze why one belligerent had success in war while the opponent failed, Boyd discovered that without exception the winner was able to act more quickly than the loser. The ability to act faster than the opponent had a psychological effect on the enemy that served "to break the spirit and will of the enemy . . .

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From this departure point Boyd devised a model to graphically depict how leaders make decisions. Boyd called his model the Observe-Orient-Decide-Act (OODA) Loop which is an elevation of a decision making process that occurs at the tactical level to the operational and strategic levels. All leaders or command structures make observations of the surroundings, orient on them, and then make decisions to take action based on the observations. Boyd believed that the key to winning in war was to have a "tighter" OODA Loop than the enemy. Further, there are actions that militaries can take to attack the enemy's loop, thus making it looser, while conversely

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<sup>52</sup> David S. Fadok, "John Boyd and John Warden: Air Power's Quest for Strategic Paralysis" (Maxwell Air Force Base: Air University Press, 1995), 1. School of Advanced Airpower Studies Masters Thesis. This thesis is also published as chapter 8 in *Paths of Heaven*. Timothy M. Connroy, "A Coming of Age: The Implications of Precision Guided Weapons for Air Power" (Monterrey, California: Naval Post-Graduate School, 1993) 25-30. Unpublished Thesis.

<sup>53</sup> Fadok, "John Boyd and John Warden," 13 and John R. Boyd, "Patterns of Conflict" (Maxwell Air Force Base, Alabama: Air University Archives, 1986) 5. Unpublished lecture.

<sup>54</sup> *Ibid.*, 14. Colonel John Boyd quoted in Fadok's narrative. Boyd's writings consist of a series of unpublished essays and lectures held in archive at the Air University.

tightening one's own OODA Loop. By disrupting the enemy's OODA Loop an antagonist can sow the seed of disorder in the enemy command structure causing the loss of "moral fiber" that ultimately leads to collapse of will. This is the concept of causing strategic paralysis, which Boyd believed lay at the heart of all theories of war including Douhet and Mitchell.<sup>55</sup> Boyd's theory is a highly Clausewitzian approach to the understanding of war in the air as DavidFadok points out in his thesis. Without prescribing a specific method for attacking enemy command structures, Boyd provided a concept for action.

If Boyd is the Clausewitz of the concept of strategic paralysis, then John Warden is the Jomini. Where Boyd laid down a broad concept, Warden took it a step further by identifying a methodology for achieving strategic paralysis. Just as the old ACTS had taken Douhet and Mitchell's discussion of vital centers and elucidated a method for attacking economic targets, Warden used the same concept to derive a system for striking command targets. Warden identified five target sets, or rings, with leadership at the center. Surrounding the center – or protecting it – were organic essentials, infrastructure, population, and fielded forces. Together these targets constituted a system that generated the enemy power base and, on the other hand, represented a critical vulnerability. Strikes that focused on the center of the bulls-eye, leadership, as well as the surrounding rings in a simultaneous campaign of attack would destroy enemy resistance. The destruction or neutralization of any of the rings has a cascading effect on the enemy command structure resulting in lengthening the enemy decision cycle, causing confusion, and ultimately collapsing the will of the enemy by paralysis. This enables achievement of the political objective and concession of the enemy to the will of the winner. Warden described his method of achieving strategic paralysis as incapacitation of the enemy armed forces by decapitation. As director of the United States Air Force Checkmate Planning Division, Warden formulated the air campaign for Operation Desert Storm using the 5-ring model. The air

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<sup>55</sup> *Ibid.*, 15-17 and Boyd, "Patterns of Conflict," 5 and 7.

campaign in the Persian Gulf War realized outstanding success as coalition forces won a lopsided victory.<sup>56</sup>

Though Boyd and Warden diverge on the construction of the respective theories – one in the Clausewitzian tradition and the other Jominian – together they “complement each other fairly well.”<sup>57</sup> Both men elevated the concept of warfare by strategic paralysis to a high plane in airpower theory and as a theory of war as well. Where Boyd remains in the abstract, Warden offers tangible solutions for achieving strategic paralysis. Their significance in the realm of airpower theory is in how both theories represent a maturation of early airpower theory. Douhet and Mitchell advocated that strategic bombing could enable a nation to win wars through economic warfare. Boyd and Warden agreed that strategic bombing was an enabler in winning wars, but examination of evidence from World War II, Korea, and Vietnam convinced them that economic warfare was the wrong approach. Instead, they advanced control warfare to achieve strategic paralysis as the correct manner of carrying out a strategic bombing campaign. Though they changed the framework of execution, Boyd and Warden maintained the spirit of the early theories. Airpower theory had evolved through the crucible of experience to a more lucid understanding of war and how it played.

The final ingredient needed for realization of the visions of Douhet, Trenchard, and Mitchell was the ability to strike from the air with a high probability that aircraft could reach the target and destroy it. The ACTS believed that unescorted high altitude precision daylight bombing would accomplish this, but it had proved a false doctrine. In World War II it required 1,000 sorties of B-17 bombers to strike and destroy a single target. Poor avionics, dumb bombs, early detection, and enemy action from the ground and in the air disrupted Allied bomber concentrations. This resulted in a low probability of hitting the target and ground fire combined with enemy fighters

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<sup>56</sup> *Ibid.*, 23-27 and John A. Warden, III, *The Air Campaign* (Lincoln , Nebraska: toExcel Press, 2000), 33-50.

<sup>57</sup> Fadok, “John Boyd and John Warden,” 36-37.

decimated Allied air fleets. Technology was simply not up to the challenge of unescorted high altitude precision daylight bombing.<sup>58</sup>

As previously discussed, the newly independent Air Force modified its doctrine to the realities of air combat after World War II. However, the dream of precision strategic bombing remained alive in spite of the shortcomings of World War II and affinity for nuclear strategy. Therefore, the Air Force pursued technology with a vengeance to enable the dreams of the early theorists. Boyd and Warden's idea of command warfare helped to accelerate this pursuit because command targets are relatively small and fleeting. Only the most precise execution could ensure destruction or neutralization of command targets placing greater emphasis on technological development. The theorists, therefore, had not only reformed the services, but they had also pushed the development of technology to its highest level to realize the promise of precision strategic bombing.

General Hap Arnold, more than any other figure, realized that a tremendous gap stood between the theory of airpower and technology and he set out to remedy this problem. In late 1944, General Arnold as Chief of the Army Air Forces, solicited the scientific community for a long-range plan to close the technology gap and realize the full potential of airpower in theory. Arnold appointed the brilliant aeronautical engineer Dr. Theodore von Karman to head up a new Scientific Advisory Group (SAG) to assist the Air Force in developing airpower technology. Dr. Karman soon produced a blueprint titled "Toward New Horizons" for developing the air arm of the United States military over several decades.<sup>59</sup>

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<sup>58</sup> Brigadier General David A. Deptula, *Effects-Based Operations: Change in the Nature of War* (Arlington, Virginia: Aerospace Education Foundation, 2001), 8-9.

<sup>59</sup> Dik A Daso, *Architects of American Air Supremacy: General Hap Arnold and Dr. Theodore von Karman* (Maxwell Air Force Base, Alabama: Air University Press, 1997), 125-131. Dr. Karman's biography is an interesting tale in itself. The Austrian scientist had served in the Austro-Hungarian army in World War I as an aeronautical engineer and conducted pioneering work in developing high performance aircraft. After the war Dr. Karman moved to Germany to take a position as professor of aeronautics at Aachen University. Here he continued his seminal work in the development of flight. The changing political situation of Nazi Germany in the mid-30s and his Jewish faith forced him to flee with his family to the United States where he accepted a position as an aeronautical researcher at California Polytechnic University. It was in this

The effort to improve airpower technology concentrated in four areas: airframes, navigation, evasion, and precision attack. The task of developing aircraft for the force produced a balanced fleet of bombers, transports, and fighters for the range of Air Force missions. Using German research captured at the end of World War II, Dr. Karman discovered methods of jet propulsion to enable aircraft to fly higher, faster, and farther, reducing the vulnerability to surface attack. The result of this work was the B-52, which became the backbone of the bomber fleet – and remains so today – entering service in 1955. Meanwhile, fighters underwent several iterations of improvement culminating in the F-15.<sup>60</sup> In addition to speed and high altitude, airframes needed the capability to evade enemy electronic detection and radar for full survivability. Stealth technology would provide the answer to this challenge.

To further improve on survivability, researchers began designing aircraft that could evade detection by radar. In World War II the fledgling radar technology had great impact on the air war in Europe. Alternately, Great Britain and Germany employed radar with great effect by providing early warning to the heartland of their respective nations. Radar enabled the Allies and Germans to inflict grievous losses on incoming bomber formations, as the warning allowed each to scramble fighters to combat the bombers. To mitigate the capability of early warning radar, scientists developed stealth technology. The concept of stealth with its odd-shaped aircraft became a reality in the late 80s with the introduction of the F117 fighter and the B-1 and later B-2 bomber. These aircraft saw combat in the 90s with outstanding success in the form of survivability of the crew and airframe, and the ability to penetrate radar screens.<sup>61</sup> Aircraft technology developed over the course of the decades following World War II represented incremental steps in improving the survivability of airframes for air superiority and global attack.

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position that his work came to the attention of General Arnold. Thus, United States gained the services of one of the top aeronautical engineers in the world much to the detriment of the German Reich.

<sup>60</sup> Dr. Michael H. Gorn, ed., *Prophecy Fulfilled: “Toward New Horizons” and Its Legacy* (Washington DC: Department of the Air Force, 1994), 85-87, 89-91, 103-108, and 152-153.

<sup>61</sup> *Ibid.*, 157-159 and Deptula, *Effects-Based Operations*, 9-10.

Although the Air Force sought survivable aircraft, there was also the need to improve the ability to find distant targets. Von Karman's research group focused on improving avionics and navigational controls. During World War II the Air Corps discovered that even when enemy fighters could not disrupt a bombing raid the flight often failed to accurately locate the target. This resulted in only 20% of ordnance dropped impacting within 1,000 feet of the intended target during the entire war. In response, the Air Force developed better cockpit controls and celestial navigation made possible by the Global Positioning System (GPS)<sup>62</sup> to aid pilot navigation. The process of improvement took several decades to implement, however the end result justified the effort. During the Persian Gulf War well over 90% of bombs dropped impacted within 1,000 feet of their intended aimpoint. This represents a better than four fold improvement in bombing accuracy due to the capability to find the target.<sup>63</sup> Complementing the ability to reach and identify the target area was the introduction of precision guided munitions (PGM).

Dr. Karman's group did seminal work in promulgating the development of PGM. As early as the mid-40s, scientists began to experiment with bombsight computers, laser tracking systems, radar homing, and celestial navigation (GPS). Research continued for the next four decades in validating these concepts. The result was laser-guided bombs (LGB), optical computer guidance, and Joint Direct Attack Munitions (JDAM). First employment occurred on a limited scale in the Vietnam War with mixed results. Two decades later in the Persian Gulf War improved PGMs took a central role in strategic bombing reaping unprecedented success. In that war 8% of total Air Force munitions expended were PGM, yet they accounted for about 30% of the total destruction by aerial assault.<sup>64</sup> PGMs closed the final gap that remained between the promise of air power in theory and the reality of it in execution as shown in the Gulf War. The ability to hit targets precisely at high speeds and altitude, resulted in a strategic effect that represented the

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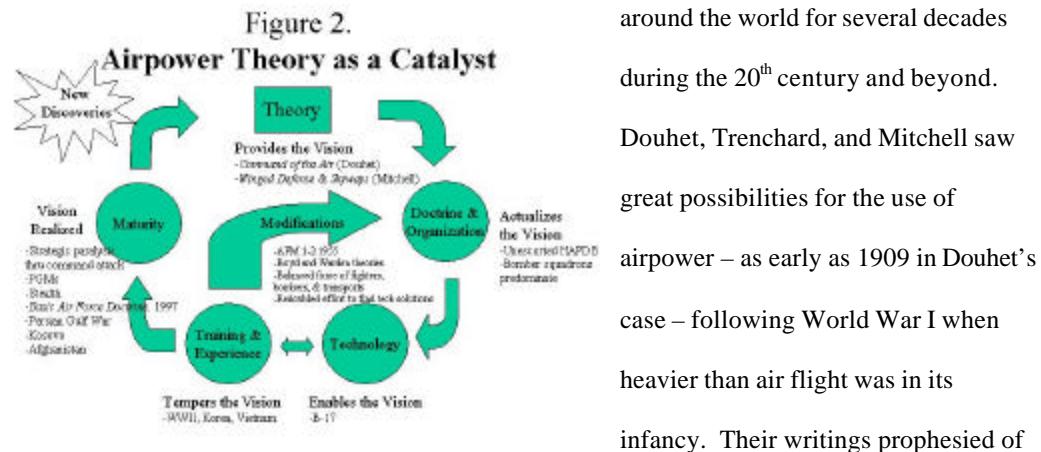
<sup>62</sup> The other military services participated in the development of GPS in conjunction with the Air Force.

<sup>63</sup> Gorn, ed., *Prophecy Fulfilled*, 128-137; Deptula, *Effects-Based Operations*, 8-9; and Conroy, "A Coming of Age," 3-5, 62-63, and 75.

<sup>64</sup> *Ibid.*, 42 and 62-64; Deptula, *Effects-Based Operations*, 8-9; and Gorn, ed., *Prophecy Fulfilled*, 138-142.

fulfillment of the early airpower theorists' vision. Airpower had reached a pinnacle of maturity as a concept of warfighting. The theorists and the ACTS instructors would not be surprised to find that current Air Force doctrine espouses such concepts as strategic attack, global dominance, and precision engagement.<sup>65</sup> Clearly, as one writer has noted, airpower had "come of age."<sup>66</sup>

The vision of the early airpower theorists provided intellectual stimulation that transformed a conservative US military establishment and gave direction for the development of air forces



aircraft flying faster than sound, at dizzying altitudes, impervious to enemy action, with the ability to destroy multiple targets. Against the backdrop of World War I they said that the nation with command of the air held a decisive instrument in wars of the future. To realize this vision the services had to reform. Indeed, through service transformation stimulated by theory, airpower has become a strategic arm of decision. (Figure 2.)

In summary, the idea of airpower as a way of war reformed the services, generated doctrine, organization, and technology. This reformation was not a 5-10 year, or even a 20-year process. It took seven to eight decades to achieve the capabilities originally envisioned by the classical air theorists. So many times technology jumps far ahead of warfighting concepts, as it did in the case of the machine gun and indirect fire, leaving militaries at a loss intellectually. The price of

around the world for several decades during the 20<sup>th</sup> century and beyond. Douhet, Trenchard, and Mitchell saw great possibilities for the use of airpower – as early as 1909 in Douhet's case – following World War I when heavier than air flight was in its infancy. Their writings prophesied of

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<sup>65</sup> Department of the Air Force, *Air Force Basic Doctrine* (Washington DC: United States Government Printing Office, 1997) 29-30, 32, and 51-52.

failure to develop sound ideas for fighting wars is often costly in terms of lives and treasure. The air theorists recognized the potential of airpower when heavier than air flight was in its infancy and offered ideas to leverage it long before the concepts were feasible technologically. Experience in war modified the vision making it more viable as the believers worked diligently to find the technology to fulfill it. Finally, eight decades after the theorists penned their treatises, airpower came of age as aircraft achieved decisive effects during wars in the 90s.

In our current struggle to transform as an Army and in the larger arena of the joint services, the airpower model is instructive. Theory helped to transform our military and provided direction for the air service over the entire 20<sup>th</sup> century driving development of doctrine, organization, and technology. Experience in war and training tempered the vision and, when combined with technology, produced an intellectually mature warfighting concept. I believe that this model, which starts with theory, is an appropriate, logical way the services and Army can find direction to transform in the 21<sup>st</sup> century.

While airpower provides an interesting study of the utility of theory, there are examples of attempting to use technology to realize intellectual change. In particular, the high technology test bed (HTTB) of the 1980s provides an instructive example of this phenomenon and an interesting contrast. Chapter 3 will examine the HTTB in more detail discussing its genesis, dynamics, and outcome with reference to generating long term change. It will provide a poignant springboard for highlighting the utility of using theory as a catalyst for intellectual change.

## **CHAPTER 3**

### **HTTB ATTEMPTS TO REFORM THE ARMY**

In early 1980 the services attempted a joint operation in the Middle East to rescue the American hostages held by the revolutionary government of Iran. The operation failed miserably revealing some serious shortfalls of capability across the services. In an effort to reform, the

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<sup>66</sup> Conroy, “A Coming of Age,” 1.

army introduced an experimental unit known as the High Technology Test Bed (HTTB) to close the gap of capability. The HTTB was an attempt to produce long-term intellectual change in the army through the catalyst of new technology. The Army did succeed in realizing an intellectual renaissance in the 80s, but not as a result of the HTTB experiment. The HTTB partially produced long-term change of significance in one aspect of warfighting – information dominance. The true stimulant for change in the 1980s came from an unexpected quarter – theory. This chapter will examine the history of the HTTB, its impact on the Army, and why it only partially succeeded. It will also review how change did occur in spite of the HTTB rather than because of it.

In late 1979 President Jimmy Carter authorized a rescue attempt to free the hostages held at the American embassy in Tehran. The effort code-named OPERATION EAGLE CLAW would involve an insertion of a small package of soldiers, airmen, and marines from Egypt and the Persian Gulf via helicopter and C-130 transport aircraft. Planning for the mission began immediately and from the beginning the commanders of the effort discovered a host of shortfalls in capability. The operation would require the servicemen to carry out tasks unheard of at the time with equipment that did not exist. For example, the air insertion would occur at night requiring all pilots to fly under night vision goggles across the trackless Iranian desert. While such a procedure is commonplace today, it was extremely rare in 1980. Additionally, the helicopters would have to refuel at a remote site known as Desert One before proceeding on to Tehran. The problem here is that forward refueling equipment did not exist and the Air Force fuel handlers did yeoman's work in jury-rigging available fueling apparatus for remote operations.<sup>67</sup> In spite of these challenges, modifications to equipment, training, and rehearsals proceeded apace for several weeks.

Finally, in April 1980 after an intensive, unbroken training regimen the operation received the final authorization to execute. Accordingly, all personnel deployed to forward assembly areas in

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<sup>67</sup> Jim Greely, "Desert One," *Airman* (April 2001), 4-5 and Paul B. Ryan, *The Iranian Rescue Mission: Why It Failed* (Annapolis, Maryland: Naval Institute Press, 1985) 1-2.

preparation for action. On 24 April 1980 the force received the ‘go’ order and the mission launched at dusk that evening. The operation proved doomed almost from the start as a series of technical, mechanical, and weather problems intervened. For successful extraction of the hostages the operation had to maintain six serviceable helicopters. Enroute to the remote refuel site the helicopters ran into an unexpected dust storm that caused two of the eight aircraft to abort. Upon arrival at the refueling site a third helicopter developed hydraulic problems requiring the mission to scrub. There was simply not enough aircraft to extract all the hostages. Reluctantly, Colonel James Kyle, the commander at the rendezvous, gave the abort order. Then, the unthinkable occurred. As one of the helicopters took off for the return trip, it inexplicably banked into one of the C-130 refuel aircraft. The ensuing explosion caused an unacceptable loss of life and equipment in the desolate Iranian desert due to the utter failure to accomplish the mission.<sup>68</sup> The failure of OPERATION EAGLE CLAW shocked the nation as the military appeared incapable of executing a military option to fulfill national policy.

Only months prior to Desert One the Soviet Union unexpectedly invaded Afghanistan. The Carter Administration feared that the Soviets would attempt to extend their influence from Central Asia into the Persian Gulf region through the unstable revolutionary Iranian government. This possibility required a firm statement of resolve on the part of the United States to prevent further encroachment by the Soviets. While the President might talk tough there was little force to back his words. The poor showing in the Iranian desert had exposed the hollowness of military capabilities in the aftermath of the Vietnam War. Here is the impetus behind a new initiative by the Carter Administration to reform the military.<sup>69</sup>

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<sup>68</sup> *Ibid.*, 63-94 and Greely, “Desert One,” *Airman* (April 2001), 5-8.

<sup>69</sup> Department of Defense, “Rescue Mission Report” [Holloway Report] (Washington DC: Office of the Joint Chiefs of Staff, 1980), 57-62 and John Costello, “The Strategic Implications of a High Technology Light Division as a Part of the Rapid Deployment Joint Task Force” (Fort Leavenworth, Kansas: Command General Staff College, 1982), 3-5. Unpublished Masters thesis. Hereafter cited as “The Strategic Implications of a High Technology Light Division.”

In response to the presidential initiative General Edward C. “Shy” Meyer, Chief of Staff of the Army, directed the Army to establish a high technology test bed (HTTB) at Fort Lewis to begin the effort to reform the Army. General Meyer believed that the Army was improperly organized to accomplish the variety of missions the nation expected. The army lacked strategic mobility because it was too heavy to deploy to worldwide trouble spots such as the Persian Gulf. In addition, the Air Force and Navy seemed unwilling to procure transport assets capable of moving the heavy equipment of the force. Finally, the organizational core rested around tank and mechanized formations with little else to complement their capabilities. Meyer’s experience as a corps commander in Europe persuaded him that the Army needed light divisions to balance the capabilities of the mechanized divisions. With these factors in mind General Meyer established the objectives for the HTTB.<sup>70</sup>

The purpose of the test bed was to reform the Army by building a credible force capable of deploying anywhere in the world using Air Force and naval transport assets that were available at that time. General Meyer intended to leverage high technology as the catalyst to develop concepts and organizations capable of contending with the prominent threat of the day, the Soviet Union, and as a bridge between light and heavy unit capabilities. In Meyer’s own words, “[T]he objective is a high-technology light division, a force with the tactical mobility, firepower and survivability of a heavy division and the airlift and sustainability requirements of a light division.” Further, “such a force would be adequate to the execution of worldwide contingency missions while retaining significant utility on the European battlefield.”<sup>71</sup> In other words, the objective of the test bed was to use technology as the vehicle of reform to develop a lighter organization that could move quickly to the far corners of the earth and hold its own against a tank equipped foe. Shortly after Meyer issued the directive, Forces Command (FORSCOM) established the initial command structure to oversee the beginning stages of the experiment.

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<sup>70</sup> Combat Studies Institute, *Sixty Years of Reorganizing for Combat: A Historical Trend Analysis*, CSI Report #14 (Fort Leavenworth, Kansas, Command and General Staff College, 2000) 57.

FORSCOM drafted a memorandum establishing responsibility for making the HTTB a viable experiment. FORSCOM had overall responsibility for directing the test bed with Training and Doctrine Command (TRADOC), Materiel Development and Readiness Command (DARCOM), and the 9<sup>th</sup> Infantry Division taking on various commitments to ensure efficient operations. Next, the Army Science Board met as a think tank at Fort Lewis to outline the direction required to make swift changes through organization and technology in the 9<sup>th</sup> ID. The approach focused in three areas: technology, tactics, and training. Technology would focus on making the light division credible against a heavy threat, extending weapon ranges, and developing automated command and control systems to allow commanders to make decisions faster. The test unit would develop new tactics to use technology to maximum advantage, provide optimum firepower-maneuver mix, and exploit threat vulnerabilities. Training would use technology such as video games to assist the unit in maintaining readiness and proficiency at individual and collective tasks. In establishing this philosophy the Science Board also established that “the technological horse” should not “drive the coach.” Rather, it was “the means to reach a desired goal rather than a goal in itself.”<sup>72</sup> Yet, a “goal” was never clearly articulated and only in one area did the admonition to not allow the “technological horse drive the coach” hold true.

With the command structure and direction established the HTTB then shifted to fielding equipment and adjusting tables of organization and equipment (TOE). The 9<sup>th</sup> ID made a comprehensive review of its organization and equipment to determine areas where it could eliminate unnecessary overhead. In addition, the unit tinkered with the structures of the organization to increase combat power while at the same time lightening the division. In conjunction with reviewing the structure, the 9<sup>th</sup> ID, DARCOM, and TRADOC began a process to accelerate procurement of promising equipment and technologies. Some of these items were already in the acquisition pipeline while others, like Radio Shack Bear Cat scanners, were off-the-

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<sup>71</sup> *Ibid.*, and Costello, “The Strategic Implications of a High Technology Light Division,” 2-3.

<sup>72</sup> *Ibid.*, 18-22.

shelf technologies. At the end of the review the 9<sup>th</sup> had culled prohibitive equipment such as heavy tentage and replaced it with civilian variants. Also, the army leased light armor vehicles (LAV) from Canada to test a protected mobile gun; fast attack vehicles (FAV) as infantry carriers<sup>73</sup>; and a host of other items like jammers and computers to enhance the spectrum of capability. The organizational review produced changes in the maneuver battalions, the division military intelligence battalion, division air defense artillery battalion, added an engineer company to each brigade, and consolidated a battalion mortar platoon at the battalion headquarters of the infantry and armor battalions.<sup>74</sup> All the changes were programmed “to get something on the ground now”<sup>75</sup> rather than waiting for the future. When the review concluded, the 9<sup>th</sup> ID began the process of brainstorming concepts and testing them in field conditions.

The 9<sup>th</sup> ID began examining concepts to fit the HTTB in earnest in late 1981. The leadership decided to consider a host of promising tactical concepts before settling on an approach. The fundamental warfighting concept adopted by the division was dubbed the “Quick Strike Division” whose mission was “to attack deep into enemy lines.”<sup>76</sup> Supporting such a mission required the division to:

- Fix the enemy
- Strike at flanks
- Reposition rapidly by ground and air
- Extend the battlefield
- Decentralize command and control
- Coordinate intelligence for deep attacks<sup>77</sup>

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<sup>73</sup> This is the well-known dune buggy that is routinely associated with the HTTB.

<sup>74</sup> Costello, “The Strategic Implications of a High Technology Light Division,” 25-32 and 42-43.

<sup>75</sup> *Ibid.*, 42.

<sup>76</sup> Stephen L. Bowman, John M. Kendall, and James L. Saunders, eds., “Motorized Experience of the 9<sup>th</sup> Infantry Division” (Fort Lewis, Washington: 9<sup>th</sup> Infantry Division), 14. Unpublished after action review held by the Combined Arms Research Library Archives.

<sup>77</sup> Costello, “The Strategic Implications of a High Technology Light Division,” 46-47. These concepts are not new as they are readily identifiable in the post-World War I theories of mobile warfare by Liddell Hart and J. F. C. Fuller from works such as “Armaments and their Future Use” and *Lectures on the F. S. R. III*.

This concept combined with a host of new technologies was supposed to bring life to a much lighter division capable of deploying worldwide and contending with any threat. However, fiscal constraint and a lack of focus doomed the HTTB to a short life and with one exception – information dominance – it produced little reform of a long-lasting nature.

The HTTB began informal field-testing at home station in 1980 and in 1982 conducted a series of formal field tests at Yakima and the National Training Center that continued through 1988. In spite of admonitions to the contrary, it appeared to some senior leaders in the army that technology was “driving the coach” of the HTTB. General Meyer expressed as early as July 1981 that the HTTB was focusing too strongly on technology as a panacea. Traditionally, the army acquisition community developed pieces of equipment, tested them, and then attempted to overlay them on the existing force structure. General Meyer wanted the HTTB to reverse this process starting with a concept of warfighting, followed by O & O to support the concept before proceeding to technological development. After examining the course of the HTTB thus far, General Meyer believed that the acquisition culture hadhighjacked his intent. Therefore, General Meyer reiterated his desire to emphasize concepts and force structure first and then moving forward with technological development.<sup>78</sup> Meyer’s effort refocused the division for a while, but soon fiscal and cultural inertia overcame his initiative.

In 1985 after a series of field tests debate raged over the viability of the 9th ID as a motorized division. Many leaders in the division, at TRADOC, and FORSCOM believed that the 9<sup>th</sup> was too heavy to deploy anywhere by airlift as its charter required. Further, the division was too light to fight a credible mechanized force. Others believed that the 9<sup>th</sup> filled a yawning gap in capabilities, but a tightfisted Congress and Pentagon would not release funds to acquire proper equipment. Instead, a series of “interim” technologies found their way into the division as substitutes until the “objective” technologies could be funded. In lieu of the objective equipment the division used the interim tools and simulated objective capabilities in tests. Test evaluators

divided on the reliability of tests conducted with the interim equipment. As a result, there was little agreement on whether to proceed with further experimentation. The fight over fielding needed technology took focus away from the effort to introduce new warfighting concepts. As the 9<sup>th</sup> ID after action review noted, “[N]ew technology was a combat multiplier only if troops had been adequately trained” and inculcated with an underlying concept of warfighting.<sup>79</sup> The wrangling over funding and test results sapped the impetus of development from the HTTB and ensured that it would bring about little in the way of lasting change for the Army, except in the information warfare arena. So, where did the Army find the stimulus for change in the 80s? The Army found the catalyst in the theoretical concept of AirLand Battle.

As the HTTB began its mature phase in 1982-1983 the concept underpinning the division capabilities began to reflect the intellectual renaissance taking place throughout the army. That renaissance took hold due to the adoption of AirLand Battle as its core doctrine. In the mid-70s the Army was in the midst of a period of painful transition shaped largely by the experience of Vietnam. As the Army spent the better part of a decade focused on counter-insurgency operations the pace of development in military affairs zoomed inexorably forward. The 1973 Arab-Israeli War demonstrated the reality of war in a high intensity environment and that our military languished in this area. Many Army leaders, including then-TRADOC commander General William E. DePuy, felt that the service suffered from a lack of intellectual rigor after Vietnam. This threatened to leave the United States far behind competitor nations in military affairs. As a result of this conviction, General DePuy embarked on a mission to reenergize the intellectual foundation of the Army as a prerequisite to modernization. His initiative culminated in the 1976 version of FM 100-5 *Operations*, which became official doctrine.<sup>80</sup> This initiated the

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<sup>78</sup> Bowman, Kendall, and Saunders, eds., “Motorized Experience of the 9<sup>th</sup> ID,” 14-15.

<sup>79</sup> *Ibid.*, 36-38.

<sup>80</sup> Paul H. Herbert, *Deciding What Has to be Done: General William E. DePuy and the 1976 Edition of FM 100-5 Operations*, Leavenworth Paper #16 (Fort Leavenworth, Kansas: Combat Studies Institute, 1988), 6-9.

process for reform in the Army that would lead to the adoption of AirLand Battle as doctrine for the 1980s.

The 1976 edition espoused a doctrine known as “active defense” to suit conditions that existed in Europe during the height of the Cold War. Many Army leaders found the emphasis on defense, calculations, and absence of consideration for the psychological dimension of war distasteful and questioned the validity of the doctrine. These reservations spawned intense debate in the Army and generated a new effort to produce doctrine more amenable to the prevailing attitudes in the Army. The new process was characterized by vigorous intellectual exercise and resulted in the 1982 edition of FM 100-5.<sup>81</sup> This iteration of the manual adopted the concept of AirLand Battle in refutation of “active defense.” The writers had thoroughly studied the doctrine and operations of the primary antagonist of the time, the Soviet Union. Based on their analysis the writers believed the best way to defeat this threat was through a doctrine of the offense characterized by deep attack and paralyzation. This concept of warfighting is a derivative of the Russian theory of war known as Deep Operations. The 1982 edition FM 100-5 matured into the 1986 version of AirLand Battle and is credited with reviving the Army and for underpinning the great victory of Operation DESERT STORM.<sup>82</sup> Therefore, the generator of reform in the Army during the 80s came not from technology, but instead from theory embodied in FM 100-5.

The HTTB eventually adopted the tenets of AirLand Battle as the underlying concept for warfighting. However, by the time the 9th accepted this concept the rest of the Army had already widely adopted the doctrine. Further, the other units in the Army were organizing and equipping to enable this vision of land warfare. Even before the development of the AirLand Battle concept the Army had actively developed and procured five new weapon systems that nested easily with

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<sup>81</sup> *Ibid.*, 96-98.

<sup>82</sup> Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory* (London and Portland, Oregon: Frank Cass Publishers, 1997), 238, 250-253, and 300-313. It should be noted that the intellectual renaissance in the Army coincided with a training revolution as well. This included the publication of a series of new training manuals such as FM 25-100 and the institution of the Army Training

the concept. The “Big 5” as they became known enabled the Army to achieve the promise of AirLand Battle. These combat systems included the Apache and Blackhawk helicopters, Abrams tank, Bradley infantry fighting vehicle, and the Multiple Launch Rocket System. Therefore, the AirLand Battle concept – a theory of land warfare with foundations in the Russian Deep Battle concept – set the stage for reform in the Army. The doctrine combined with the “Big 5” drove the development of organizations to fulfill the visionary concept. Training at places like the National Training Center (NTC) and in simulation with the Battle Command Training Program (BCTP) tempered and modified the concept. The experience of the Persian Gulf War represented the maturity of AirLand Battle as a concept of warfighting grounded in theory.<sup>83</sup> If it is true that the intellectual change of the 80s derived from theory then why was the HTTB only partially successful?

Among the multiplicity of reasons for failure of the HTTB, including fiscal and parochial, the fundamental reason is intellectual schizophrenia produced by lack of a unified vision. In spite of warnings from General Meyer and his successors, the technological aspect of the HTTB overcame the conceptual underpinnings and helped lead to a collapse of the experiment. Simultaneously, the Army experienced a rediscovery of intellectual vigor through the process of adoption of AirLand Battle. This further led to development of organizations and technology to enable the concept. The success of the Gulf War sealed the fate of the HTTB as one senior officer declared “that the Army had a ‘perfectly reasonable division’” exemplified by the AirLand Battle tank and mechanized organizations. The force at hand had reasonably executed national policy and the cost of maintaining multiple division designs seemed superfluous. By 1992 the HTTB and 9th ID had dismantled as a round of reductions culled the force structure.<sup>84</sup>

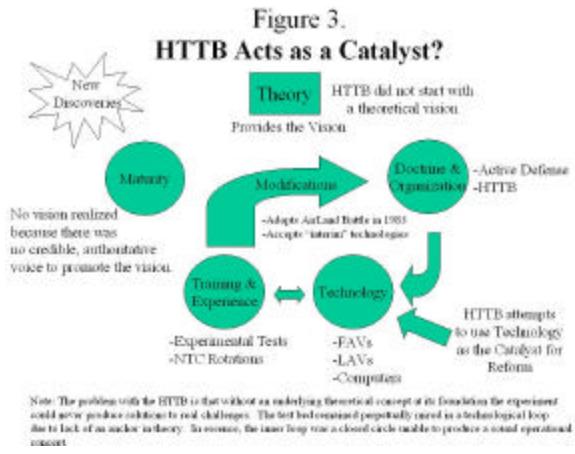
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and Evaluation Program (ARTEP), rotations to the combat training centers (CTC), and the Battle Command Training Program (BCTP).

<sup>83</sup> *Ibid.*, 236-238.

<sup>84</sup> James Jay Carafano and Glen R. Hawkins, *Prelude to Army XXI: US Army Division Design Initiatives and Experiments* [book on-line] (Washington DC: United States Army Center for Military History, 1997,

The HTTB initially attempted to assimilate multiple concepts using the catalyst of high technology. These concepts ranged from Hart and Fuller's discussion of scout cars in non-contiguous operations to John Boyd's concept of the OODA loop. Additionally, any "good idea" was considered viable until proven untenable. Therefore, without the singlemindedness of a unified concept of war the HTTB flailed around in a search for an intellectual foundation. The



technological aspect of the experiment focused primarily on improving weapon ranges, lightening equipment and deployability. While this is an admirable endeavor, there is nothing new about the continual pursuit of improved systems. Not surprisingly, this produced no sustained impetus for long-term reform

since improved weapon systems only built upon existing concepts of war. After the HTTB received mixed reviews from early rounds of training exercises, the division, like the rest of the Army, adopted AirLand Battle as its core concept in 1982-83. However, it would not receive the required equipment to fulfill the vision ensuring that the HTTB could not live up to its billing.<sup>85</sup> Similarly, the effort to transform in our time could suffer the same fate because without a unifying concept of war grounded in theory the Army will be unable to utilize technology to its fullest potential. (See Figure 3).

One aspect of the HTTB that had, and continues, to fuel long-term change is the concept of information dominance. Information dominance as a warfighting concept is derived from John Boyd's seminal papers on decision-making. Many army officers discovered the utility of his vision and sought ways to make it a practical command concept for the Army just as in the Air

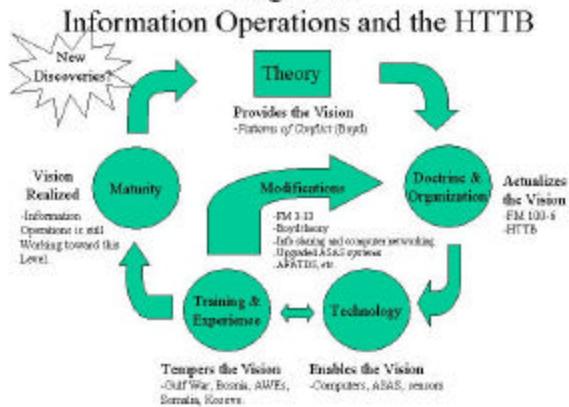
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accessed on August 8, 2002), 3-4. Available from <http://www.fas.org/man/dod-101/army/unit/docs/xxi/xxipart3.htm>.

Force. As pointed out in Chapter 2, Boyd's premise is that success in battle is directly proportional to one's ability to make informed decisions more quickly than your adversary. Every commander observes his environment, orients to it, decides on a course of action, and puts that decision into action. The key is to make this decision loop – Boyd's OODA Loop – tighter than the enemy and make him react to your initiative.<sup>86</sup>

With this vision in mind the HTTB introduced highly innovative concepts to bring the theory to fruition. To enable the concepts the test bed identified a number of technologies that could

Figure 4.



help the commander tighten his OODA Loop. For example, the 9<sup>th</sup> ID tested unmanned aerial vehicles (UAV) and advanced sensors to acquire information and identify targets at extreme ranges. Soldiers of the division also tested a new computer system to collate the

information gathered to enable the commander to orient his observations. This system became known as the all source analysis center and is the forerunner of the current all source analysis system (ASAS). Armed with “real-time” information and sound analysis from the computer and intelligence section a commander could eliminate much of the fog of war and act quickly on this knowledge.<sup>87</sup> The HTTB spawned the promulgation of initial doctrine of information warfare, which the Army continues to modify and refine to the present. (See Figure 4) Therefore, Boyd’s elucidation of command and control warfare planted the seeds that provided direction for the Army and other services in the area of information warfare. The HTTB was instrumental in writing doctrine and testing fledgling technology to support this vision. Training and practical

<sup>85</sup> Bowman, Kendall, and Saunders, eds., "Motorized Experience of the 9<sup>th</sup> ID," 22, 31-32, and 35-36.  
<sup>86</sup> Boyd, "Patterns of Conflict," 5 and 7 and Fadok, "John Boyd and John Warden," 15-17.

experience tempers this vision and modifies the doctrine and tools that enable it at the present time. At the start of the 21<sup>st</sup> century Boyd's theory of information warfare continues to provide direction for decades to come as it draws nearer to a mature concept. The HTTB did not, however, adopt a theory of war that unified information warfare with other concepts into a coherent vision of warfighting. Instead, it chose many good ideas from a host of sources and thus failed to focus its development in a single direction. If the experiment had grounded its concepts in a unified theory it could possibly have affected reform and long-term intellectual change in the Army across the spectrum of warfare.

The transformation of the Army and joint services must succeed if the United States is to protect its vital national interests and remain the leader of the democratic world. The current approach to transformation is a decidedly technological effort similar to the experience of the HTTB of the 1980s. The HTTB partially failed because it did not adopt a unified theory of war as it was at that time and could be in the future. During this effort to transform (reform) the services, perhaps a different approach is in order. A coherent joint capstone statement by the services of what war looks like today and in the future could provide the vision to stimulate the process. Such a statement must also describe the American way of war in the coming century to guide the development of doctrine, technology, and training.

As this chapter points out the HTTB did not fully succeed for a number of reasons. But, at heart the reason it only partially succeeded was because it did not have a unified theory of war to provide an intellectual foundation for experimentation and development. Rather, it pulled concepts and good ideas from a variety of sources such as older theoretical works of Fuller and Hart and from fresher ideas such as Boyd's. This tended to disperse the focus of the HTTB division and the unit defaulted to technology as a panacea. The Army Science Board, General Meyer, and senior Army leaders warned against allowing technology overtake the intellectual impetus of the division. Yet, this is exactly what occurred by 1982-83. In an effort to refocus the

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<sup>87</sup> Costello, "The Strategic Implications of a High Technology Light Division," 22, 31-32, and 35-36.

HTTB adopted AirLand Battle as its intellectual foundation, but after 1985 the division was never able to acquire the technology required to fulfill the vision of the concept. Other units in the Army were fielding the “Big 5” systems that allowed the concept of AirLand Battle to realize success. By the late 80s the HTTB was withering on the vine and the success in the Persian Gulf sealed its fate. Only the concept of information dominance survived the test bed.

Transformation could suffer the same fate as the HTTB if it relies too deeply upon technology to bring about reform. Instead of following this paradigm for transformation this monograph proposes that perhaps theory could provide the catalyst the services need to bring about desired reform. The final chapter of the paper will summarize the argument and offer recommendations for how the services can produce a document stating what war looks like today and into the 21<sup>st</sup> century. Also, it will address what such a statement should contain to provide direction for future development of the force. Finally, it will suggest a possible methodology for promulgating such a document.

## **CHAPTER 4**

### **CONCLUSION AND RECOMMENDATIONS**

The effort to reform in the Army, called Transformation, began in 1999 with the publication of *The Army Vision*. The process has used a decidedly technological direction to stimulate reform. This has led to much debate about whether technology can deliver the expected transformation, if change is even needed, and if there might be another approach. Other armed forces have attempted to use technology to bring about change, but with mixed results. Technological stimulus is not the only means of reform available, however. A new theory of war could act as a catalyst to produce desired reform. This could help crystallize the direction for developing doctrine, organizations, and technology rather than starting with technology and then

discovering concepts of warfighting. As a result of this survey, it appears that while theory does not require reform any effort to reform does require theory as a foundation.

To illustrate how theory could stimulate transformation, this monograph illustrated how air power theory drove development of the American military and Air Force in the 20<sup>th</sup> century. When the fledgling airplane was in its infancy visionaries such as Douhet, Trenchard, and Mitchell offered theoretical concepts of a new way of making war from the air that would transform conduct of warfare. These treatises, published as books with highly refined ideas, gave their successors the direction to devise doctrine, form organizations, and develop technology. Although the concepts were not entirely correct, they did give airmen direction to focus their efforts to transform the services. Over the course of time training and war experience modified the early theories to make them viable against the reality of war. In other words, theory made the practical possible.

John Boyd and John Warden repackaged airpower thought, retaining the spirit of the early theories, but modifying the mechanics. This combined with the quest to bring long awaited technologies to fruition drove airpower theory to full maturity. Many of the concepts first envisioned by Douhet, Trenchard, Mitchell, and the ACTS are now possible. They are enabled by doctrine, organizations, and technology that took decades to develop. The early theorists provided direction for a transformation that evolved over several decades. A new American theory of war that similarly encompasses war on land, in the air, on sea, and across the spectrum of conflict could give ours and subsequent generations the stimulus needed to affect real reform as airpower theory did in the 1920s.

By contrast the HTTB had only limited lasting impact in affecting reform in the Army in the 1980s and after. The HTTB began as a result of the tragedy in Iran and the Soviet threat in the Persian Gulf region. The 9<sup>th</sup> Infantry Division received a variety of technologies such as FAVs and LAVs for experimentation with the expressed purpose of generating reform in the Army. Using technology as a catalyst, the HTTB tried many “good ideas” in an effort to discover new

concepts of warfighting. Within a couple of years it became apparent that technology had taken precedence over warfighting concepts since the division seemed at a loss in producing meaningful change. This prompted a cautionary note from General Meyer, then Chief of Staff of the Army, to ensure that warfighting concepts took precedent.

After 1983 the HTTB began to focus on AirLand Battle as its fundamental warfighting concept. It then used technology in an attempt to enable the doctrine. However, the rest of the Army was already undergoing change as a result of the introduction of the AirLand Battle concept. Further, the Army was building organizations and other technologies like the Abrams tank and Apache helicopter to realize the vision of this concept. After 1985 the HTTB began to take a back seat to the rest of the Army and expected new technologies programmed for experimentation in the 9<sup>th</sup> Infantry Division were cut by the Army. The resounding victory of the Gulf War in 1991 led the senior leadership of the Army to believe that the presence of the HTTB was superfluous. Why, reasoned Army leaders, retain a division of marginal utility when the Gulf War had proven the viability of AirLand Battle and the supporting organizations and technology that made the victory a reality. As a result, the Army slashed the HTTB from the force structure in 1992 ten years after it had lost its relevance.

The only lasting change produced from the decade long experiment was the concept of information warfare. Technology did not generate this concept though. On the contrary, the information dominance concept is grounded in John Boyd's theory of command decision making. To the credit of the leaders of the HTTB, they grasped this theory as a vision that could stimulate lasting change in the Army. The HTTB began writing information papers, drawing up organizations, and fielding equipment like the early ASAS computer to make Boyd's theory a workable concept on the battlefield. Though the HTTB died, the information warfare concepts fleshed out by the division live on. The effort produced the first doctrinal manual and new generations of technology to make information warfare viable. The interesting aspect is that John Boyd's theory of command decision making stimulated this change and the impetus behind it

continues today and into the foreseeable future. Technology did not generate this change, it was a part of an overall conceptual approach to warfighting. The cases of airpower and Boyd's command theory provide reasonable evidence that a new theory of war could act as an alternative to technological stimulus to drive transformation for decades to come.

Based on those observations the question arises, how might the services and Army generate or adopt a new theory of war? There is some precedence in recent times for how our services might begin a process of adopting a theory of war to stimulate reform. In the late 1950s the Soviet Union began a process of reexamination of their military organizations with an eye toward reform. The Soviet political apparatus and military went through a painstaking process of evaluating the nature of war and the central warfighting concepts they espoused for prosecuting war. Soviet efforts resulted in a three-tier structure theory of how their nation viewed war and its conduct. The elements of the framework included a general theory of armed struggle in all its forms, military art, and a theory of schooling and training armed forces for war.<sup>88</sup> Their theory of deep operations acted as a catalyst that produced their doctrine and organizations and drove technological development. The theory became institutionalized in units and schools to provide the fullest understanding of its elements and buy in from individuals.

The force behind production of a new theory in the Soviet Union was the communist party and not the military organizations. This model provided a singlemindedness of purpose that made the writing of theory relatively easy in the Soviet Union. The political and military realms are inseparable in the communist system, since together they act to end class struggle. Therefore, a theory of war was an integral part of Soviet state political philosophy.<sup>89</sup> While this model for producing a theory of war worked for the Soviets, it would be infinitely more difficult for the military organizations in America to generate a viable theory given the differences in our system.

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<sup>88</sup> Julian Lider, *Military Theory* (New York: St. Martin's Press, 1983) 262-263.

<sup>89</sup> *Ibid.*, 261-262.

However, there is a recent example within our own services that could provide a model to enable production of a new theory of war.

In January 1996 the U. S. Navy and Marine Corps promulgated a new concept of war that in essence is a theory of amphibious operations for the 21<sup>st</sup> century. The Marines dubbed the new concept Operational Maneuver From the Sea (OMFTS). The paper declared that “chaos in the littorals” was changing the operational environment with the demise of the Cold War. Rather than conducting amphibious operations in the traditional manner by landing on an assault beach, securing a lodgement, and then pressing inland to a distant objective, OMFTS would perform an amphibious assault from over the horizon straight to the objective without securing a lodgement. This would reduce inevitable casualties associated with amphibious assaults by jumping over the beach defenses. Thus, the concept of over-the-horizon to objective amphibious operations represents a leap in amphibious thinking and operational capabilities.<sup>90</sup>

Since the introduction of the concept both the Navy and the Marines have incorporated it into their doctrine. Further, the Marines identified several items of emerging technology, such as the Osprey tilt-rotor aircraft and the Advanced Amphibious Assault Vehicle (AAAV), for further development to enable the concept. Finally, both services have experimented extensively with the concept in simulation and training to refine OMFTS making it a viable way to make war under realistic conditions. The concept is taught in their service schools and written into manuals, thus institutionalizing it from the ground up with all personnel. Today and into the foreseeable future OMFTS is providing the Navy and Marines with direction for developing their unique capabilities for the 21<sup>st</sup> century.<sup>91</sup> The key to making this cultural shift was not the theory in and of itself. Instead the shift was made possible by the Marine Corps’ will to institutionalize the theory to ensure the service would buy into the concepts.

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<sup>90</sup> Department of the Navy, Headquarters, United States Marine Corps, “Operational Maneuver From the Sea” (Washington, DC: United States Government Printing Office, 1996), 3-6 and 9-11 and Charles C. Krulak, “Operational Maneuver From the Sea,” *Joint Force Quarterly* (Spring 1999), 78-83.

## **Recommendations**

While the nature of war is not changing the operational environment and methods of waging war certainly are. This requires our military to keep pace with the changes in order to maintain adequate security for the nation. The Army's effort to reform, known as transformation, is laudable and demonstrates an understanding that remaining stagnant in the face of rapid change is a recipe for disaster for the force and the nation. However, while adopting new technology is an integral part of the process, using it as the primary catalyst for change may not produce an intellectual transformation. Therefore, the military and Army should adopt a new theory of war to stimulate concepts of warfighting as well as development of technology to enable the concepts.

There are several ways that our leaders could set about adopting a theory of war. Before starting, the Defense Secretary should seat a panel of leaders from all services including uniformed, academic, and civilian personnel chaired by the National Defense University (NDU).<sup>92</sup> Their charter would be to recommend a theory of war for adoption by the Defense Department based on a thorough evaluation of the nature of war, current and future operating environment, and how America should prosecute war within this framework in the future. In so doing, the panel could adopt an existing theory, such as Effects-Based Operations (EBO), Fourth Generation Warfare, Network-Centric Operations, or Rapid Decisive Operations (RDO), though none of these seem comprehensive enough to provide a thorough explanation of war in all its forms today. Most recent theories are simply too narrow since they focus on only one aspect of war. Therefore, a new comprehensive theory that is perhaps a synthesis of several existing theories could provide the necessary understanding and direction for transformation.<sup>93</sup>

The panel should commission the best thinkers in our nation to produce a new theory. These thinkers could come from academia, think tanks, and our service schools. Once brought together

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<sup>91</sup> *Ibid.*, 83-86 and Department of the Navy, United States Marine Corps, "Operational Maneuver From the Sea," 17-20.

<sup>92</sup> Wells, "Center of Gravity Fad," 10-11.

under the auspices of the NDU chairman, they could begin work on comprehensive theory with each thinker working within his own area of expertise. Each would produce a point paper outlining the nature of that aspect of warfare and warfighting concepts. The chairman, acting as a general editor, would then arrange the papers ensuring a unifying thread into a general theory of war for America. Julian Lider proposes that a military theory should contain the following:

1. A description of the nature of war: its causes, social function, and consequences
2. Types of war: classification of wars
3. War and revolution
4. Factors affecting the course and outcome of war
5. How is war to be won (i.e. our vision of war winning strategy; EBO, RDO, synthesis)
6. How can war be prevented<sup>94</sup>

Using this structure as a framework our services could produce a logical theory of war in line with our national character to provide direction for service transformation far into the 21<sup>st</sup> century.

Once the experts produce the theory the general editor would present the manuscript to the Defense Secretary's panel for a review process by the services. This will undoubtedly generate enormous debate and challenges to the concepts contained therein. However, the review would provide a healthy environment through which the services could flesh out the ideas and seriously consider the nature of war in the modern world. Once any modifications are approved the Defense Secretary and Joint Chiefs of Staff would then present the theory to Congress and the services as a part of an upcoming Quadrennial Review (QDR). When the theory clears the QDR the Defense Secretary would then formally approve it as an official statement of our understanding of the nature of war and ways to prosecute it in the current and future operating

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<sup>93</sup> Kugler and Binnendijk, "Choosing a Strategy," in *Transforming America's Military*, Hans Binnendijk, ed., 83-84.

<sup>94</sup> Lider, *Military Theory*, 14 and 408-409.

environment. The adoption of the theory would represent the first step toward institutionalizing the concepts in the theory.

A unified theory of war however, will not guarantee permanent, sustained intellectual growth without further effort to institutionalize the concepts. Allan R. Millet points out that new ideas about war cannot take hold unless service organizations make a conscious effort to make innovation an integral part of the culture. In so stating Millet offers ways to institutionalize new theoretical concepts. First, services can create organizations to enable the concepts and offer a vehicle of improvisation for reformers to channel their creative energies. Second, militaries can produce “disciples” of the new concepts by making them part of service school curriculum. Finally, military organizations should write the concepts into doctrinal manuals. In the historical cases analyzed by Millet, successful reform generally took hold in militaries that adopted this approach to transformation and this model could assist the United States military services in the 21<sup>st</sup> century.<sup>95</sup>

The Army and the joint services’ effort to reform is timely and demonstrates an understanding that in order to remain a relevant force in the midst of constant change, the force must keep pace with the changes. Transformation, which began in 1999 in earnest, initially took a decidedly technological approach to stimulate change. Although technological change is an integral aspect of transformation, using it as a primary catalyst to change may not produce the hoped for reform the services desire. The Army, as well as academics and think tanks, is beginning to recognize that conceptual change is as important as technological. The evidence confirming the trend is the spate of recently published papers that press for the introduction of new concepts of war such as the “Objective Force White Paper”; *Conceptual Foundations of Transformed U. S. Army*; and *Transformation Concepts for National Security in the 21<sup>st</sup> Century*.

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<sup>95</sup> Allan R. Millet, “Patterns of Military Innovation in the Interwar Period,” in *Military Innovation in the Interwar Period* (Cambridge, UK: Cambridge University Press, 1996), 349.

<sup>96</sup> Of these publications, *Conceptual Foundations for a Transformed U. S. Army* by Huba Wass de Czege and Richard Hart Sinnreich provides, in my opinion, the best synopsis of what war looks like in the 21<sup>st</sup> century and how the Army operating in a joint arena can prosecute war in the future. It is an excellent building block for a theory of war. The Army and services can build upon this recognition by adopting a comprehensive theory of war to provide the intellectual underpinning to new technology, doctrine, and organizations.

This monograph does not downplay the significance and need for emerging technologies in the conduct of future warfare. However, I believe that theory is central to any effort to reform and this paper recommends that theory could act as a viable alternative catalyst to provide direction for transforming the services. The new concepts found in theory could stimulate the development of the doctrine, organizations, and technology so the United States military can remain the dominant force of the future. Therefore, I recommend that the Army and services adopt a new theory of war at the earliest possible date to provide the long-term direction for change over the course of the 21<sup>st</sup> century.

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<sup>96</sup> Department of the Army, "Concepts for the Objective Force," Army White Paper, ii; Huba Wass de Czege and Richard Hart Sinnreich, *Conceptual Foundations of a Transformed U. S. Army*(Arlington, Virginia: The Institute of Land Warfare, 2002); and Williamson Murray, ed., *Transformation Concepts for National Security in the 21<sup>st</sup> Century*(Carlisle, Pennsylvania: 2002).

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